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A New Species of *Alcyonosyllis* Glasby and Watson, 2001 (Polychaeta: Syllidae: Syllinae) from Shimoda, Japan, Commensal with the Gorgonian *Melithaea flabellifera*

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ABSTRACT—A new species of *Alcyonosyllis* Glasby and Watson, 2001 (Polychaeta: Syllidae: Syllinae) is described from shallow water of Shimoda, Izu Peninsula, Japan. The worms were commensal with the gorgonian *Melithae flabellifera* (Kükenthal, 1909). *Alcyonosyllis glasbyi* n. sp. differs from all other species of the genus in having a single chaeta per parapodium. The genus is new to Japan.

Key words: New species, Syllidae, Polychaeta, symbiosis, Shimoda

INTRODUCTION

The family Syllidae is one of the most diverse of the class Polychaeta (Annelida). Species of Syllidae are distributed along all the coasts. They inhabit all kinds of coastal substrates and include commensal or parasitic symbionts of many other marine invertebrates (Martín and Britayev, 1998). One of these symbiotic Syllidae taxa is the recently discovered genus *Alcyonosyllis* Glasby and Watson (2001). It is composed by at least two species: *Alcyonosyllis phili* Glasby & Watson, 2001, associated with octocorals, Nephtheidae, and *Melithaea* spp. in northwestern, northern and eastern coasts of Australia and southern Papua New Guinea (Glasby and Watson, 2001), and *A. xeniaecola* (Hartmann-Schröder, 1993) associated with the alcyonacean *Xenia viridis* (Hartmann-Schröder, 1993; Glasby & Watson, 2001). According with Glasby & Watson (2001), some species currently allocated to *Haplosyllis* could belong to this genus; we think that *H. bisetosa* Hartmann-Schröder, 1960 is likely to belong to this genus and thus compared our new species to the taxon in the remarks.

Material of an undescribed species of syllid was collected in Shimoda, southern part of Izu Peninsula, during the graduate course research of Mr. N. Kumagai on the amphipod *Pleusymtes symbiotica* Gamo and Shimpo, 1992 (Amphipoda: Pleustidae) symbiotic with the gorgonacean (Kumagai, 2001). In this paper, we describe this material as a new species of *Alcyonosyllis*, namely *A. glasbyi* n. sp. The diagnosis of the genus is that of Glasby & Watson (2001).

MATERIALS AND METHODS

The syllid and host gorgonians were collected in Shimoda, southern part of Izu Peninsula, Shizuoka, Japan (34° 57' N, 138° 57' E: Fig. 1). The syllids were removed from the host *Melithaea flabellifera* (Kükenthal, 1909) in the laboratory. The number of worms per host was 1–3. Observations and drawings were made with a compound microscope, provided with interference contrast optics (Nomarsky) and a drawing tube. Scanning electron microscope (SEM) observations and micrographs were taken at SIDI (Servicio Interdepartamental de Investigación), Universidad Autónoma de Madrid, Spain, and Yokohama National University. Type material has been deposited at the Coastal Branch of Natural History Museum and Institute, Chiba, Japan (CMNH), Museo Nacional de Ciencias Naturales de Madrid (MNCNM), the Museum and Art Gallery of the Northern Territory, Darwin (NTM), Zoological Museum of Hamburg (ZMH), the Australian Museum, Sydney (AM), the South Australian Museum (SAM), Senckenberg Museum, Frankfurt (SMF), Natural History Museum and Institute, Chiba (CBM), Zoological Institute, Hokkaido University (ZIHU), The Allan Hancock Foundation Polychaete Collection of the Los Angeles County Museum of Natural History (LACM-AHF POLY), The Smithsonian Institution, National Museum of Natural History, Washington D. C. (USNM), Museum National d'Histoire Naturelle, Paris (MNHN), and Shimoda Marine Research Center, University of Tsukuba, Japan (SMRC). The host gorgonian of the syllid has been deposited at the Coastal Branch of Natural History Museum and Institute, Chiba, Japan (CMNH).

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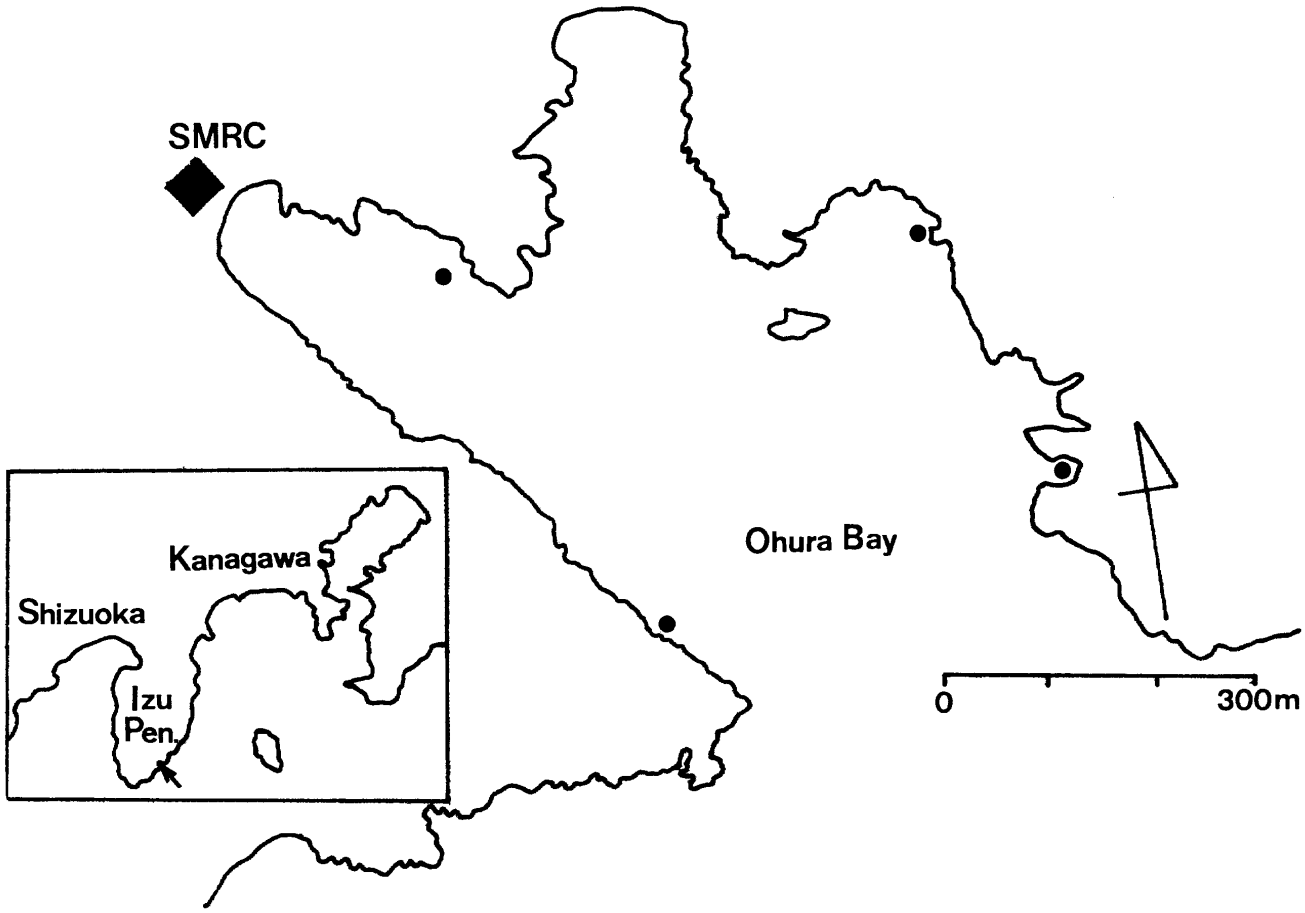

Fig. 1. Map of collection site. SMRC shows Shimoda Marine Research Center, University of Tsukuba. In Ohura Bay, the collection sites of syllid and gorgonians are indicated by dots.

RESULT

Systematics

Family **Syllidae** Grube, 1850

Subfamily **Syllinae** Grube, 1850

Genus ***Alcyonosyllis*** Glasby & Watson, 2001

Alcyonosyllis glasbyi n. sp.

(Figs 2, 3, 4)

***Material examined*: Holotype** CMNH-ZW01399- Ohura Bay (= Nabeta Bay), Shimoda, Izu Peninsula, Shizuoka, Japan, shallow water of rocky shore, 3–15 m depth, coll. N. Kumagai, 7 Dec. 2001. **Paratype** NTM-W018260, - 8 June 2001, collection site and collecter of all paratypes are same as for holotype; **Paratype** ZMH P-24460, - 7 July 1998; **Paratypes** MNCNM 16.01/9043. - 8 June 2001, 16.01/9044. - 6 February, 2002, 16.01/9045, - 30 May, 2002. 16.01/9046, - 19 June, 2002. 16.01/9047, - 24 June, 2002. 16.01/9048, - 27 June, 2002. 16.01/9049. - 18 July, 2002; **Paratype** AM W28641, - 8 June, 2001; **Paratype** SMF 12069, -10 Feb. 2002; **Paratype** SAM E3301, - 27 June 2002; **Paratype** CBM-ZW945, - 28 July, 2002; **Paratype** ZIHU-2314, - 28 July, 2002; **Paratype** AHF POLY - 28 July 2002; **Paratype** USNM 1008963, - 28 July 2002; **Paratype** MNHN POLY 1378, - 28 July, 2002; **Paratype** SMRC-POL-001, - 28 July, 2002; **Paratypes** CMNH-ZW01462 (stolon), - 7 December 2001, -ZW01461, 28 July 2002. The paratype used for SEM is deposited at the MNCNM (16.01/9043).

***Color and habitat*:** The color of living worms is orange or light yellow and it might be considered as camouflage on a host whose color is light to dark orange or light yellow (Fig. 2A–E). All syllid worms induce the host to react; some of them are buried in host tissues in tubular nest (Fig. 2C), while some others induce the formation of secondary tubular shelter-like structures (Fig. 2D). The color of preserved worms is semi-transparent or light pink. The trunk provided with a large transversal band red coloured on each segment, sometimes broken in three patches flanked by two small patches near anterior and posterior margins (Fig. 3A). The new species may be obligatory commensal because of close association of syllid and host gorgonian and free-living forms are unknown around Shimoda (Nishi *et al*, 2001; Nishi and Kato, unpublished).

***Description*:** Body long, slender, with numerous segments, similar in width throughout (Figs. 3A, 4A) except on posterior end, which is abruptly tapered and subcylindrical. Holotype complete, posterior end regenerated, 16 mm long, 0.4 mm wide with parapodia, 95 chaetigers. Paratype NTM W018260 is incomplete, with 42 chaetigers; paratype ZMH P-24460 is complete, with 97 chaetigers; paratype MNCNM (16.01/9043) is complete, broken in two pieces, 94 chaetigers, with

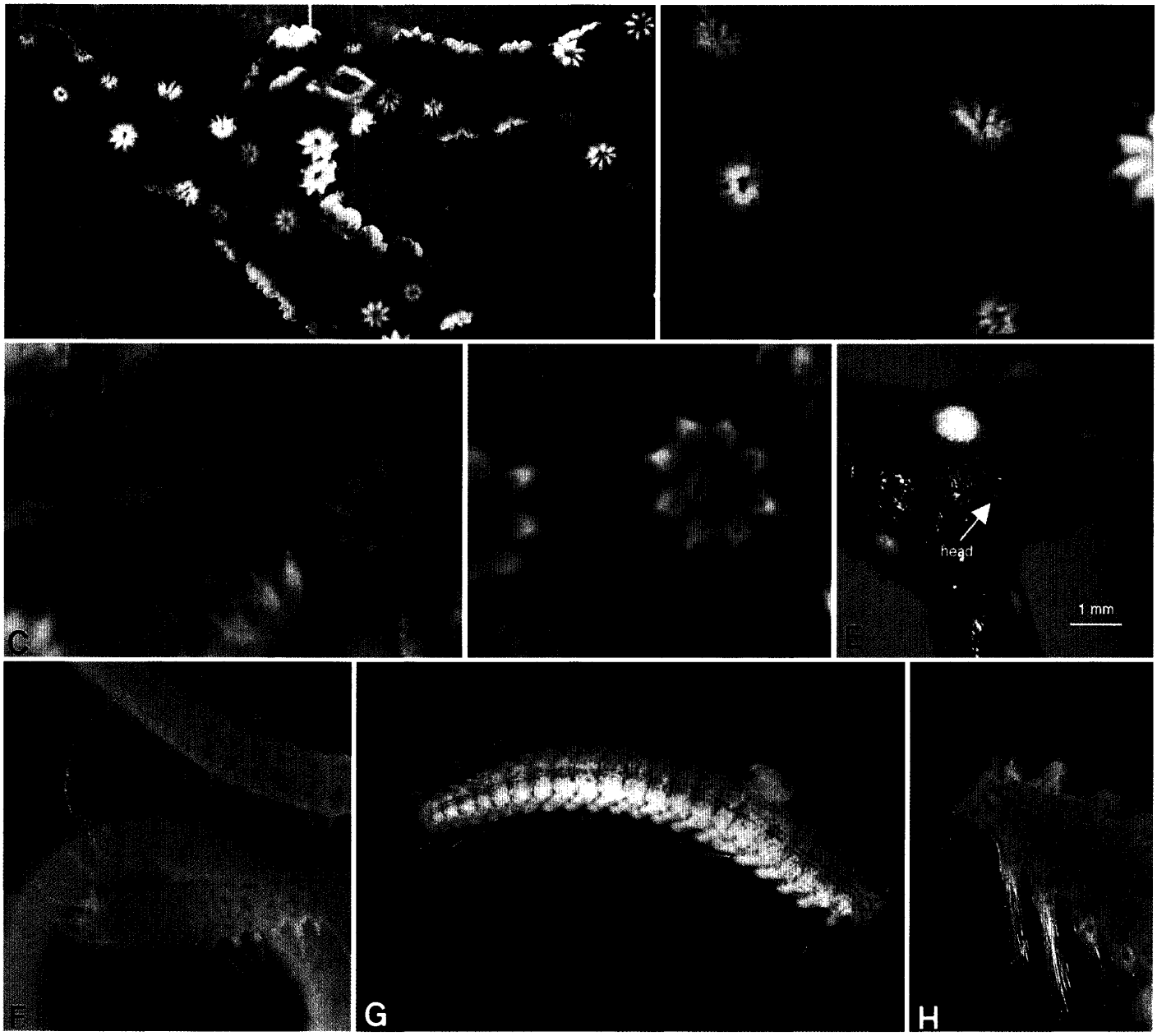

Fig. 2. *Alcyonosyllis glasbyi* n. sp. and host gorgonian *Melithaea flabellifera* (Kükenthal, 1909). A to E shows association of syllid and gorgonian. In C, arrow shows tubular structure; in D, part of worm embedded in tubular structure (left arrow). In A, B, D, E, arrow show syllid worm. F, non-type specimen of *A. glasbyi* showing pigmentation in preserved worm. G, detached stolon with extended epitokal chaetae, eyes and tentacles. H, close-up view of anterior part of stolon.

an stolon; paratype AM W28641 is incomplete, 78 chaetigers, with an stolon. Prostomium oval; four eyes in open trapezoidal arrangement (Fig. 3A). Median antenna longer than combined length of prostomium and palps, inserted on middle of prostomium; lateral antennae distinctly shorter than median one, inserted in front of anterior eyes, near anterior margin of prostomium. Palps broad, similar in length to prostomium, free to each other except basally. Peristomium distinctly shorter than subsequent segments (Figs. 3A, 4B); dorsal tentacular cirri long, similar in length to median antenna; ventral tentacular cirri about 1/3 of length of dorsal ones. Antennae, tentacular cirri and dorsal cirri smooth, somewhat rugose, not articulated but with some pseudoarticulation (Fig. 4B), somewhat inflated, especially shorter ones (Fig. 4B). Dorsal cirri of chaetiger 1 longer than dorsal tentacular cirri; those of chaetiger 2 shorter than half of length of those of chaetiger 1; those of chaetiger 3 longer than those of chaetiger 2 but shorter than those of chaetiger 1; subsequent segments with long or short dorsal cirri (Fig. 4A); long dorsal cirri similar in length to width of corresponding segment; short cirri about 1/3 of length of long cirri; usually some segments in which the proventriculus is located when the pharynx is retracted, have short cirri (Fig. 3A). Posterior segments with dorsal cirri shorter than those of anterior ones. Minute pores present on dorsum and dorsal cirri (Fig. 4C). Parapodia blunt; ventral cirri digitiform or conical, longer than parapodial lobes (Fig. 3B). Parapodia each with solitary chaeta, occasionally two, slender, with a short subdistal boss (Fig. 4E), minute secondary teeth (Fig. 4E, F, arrow) and slender, acute tip, dorsally directed (Fig. 3C–J);

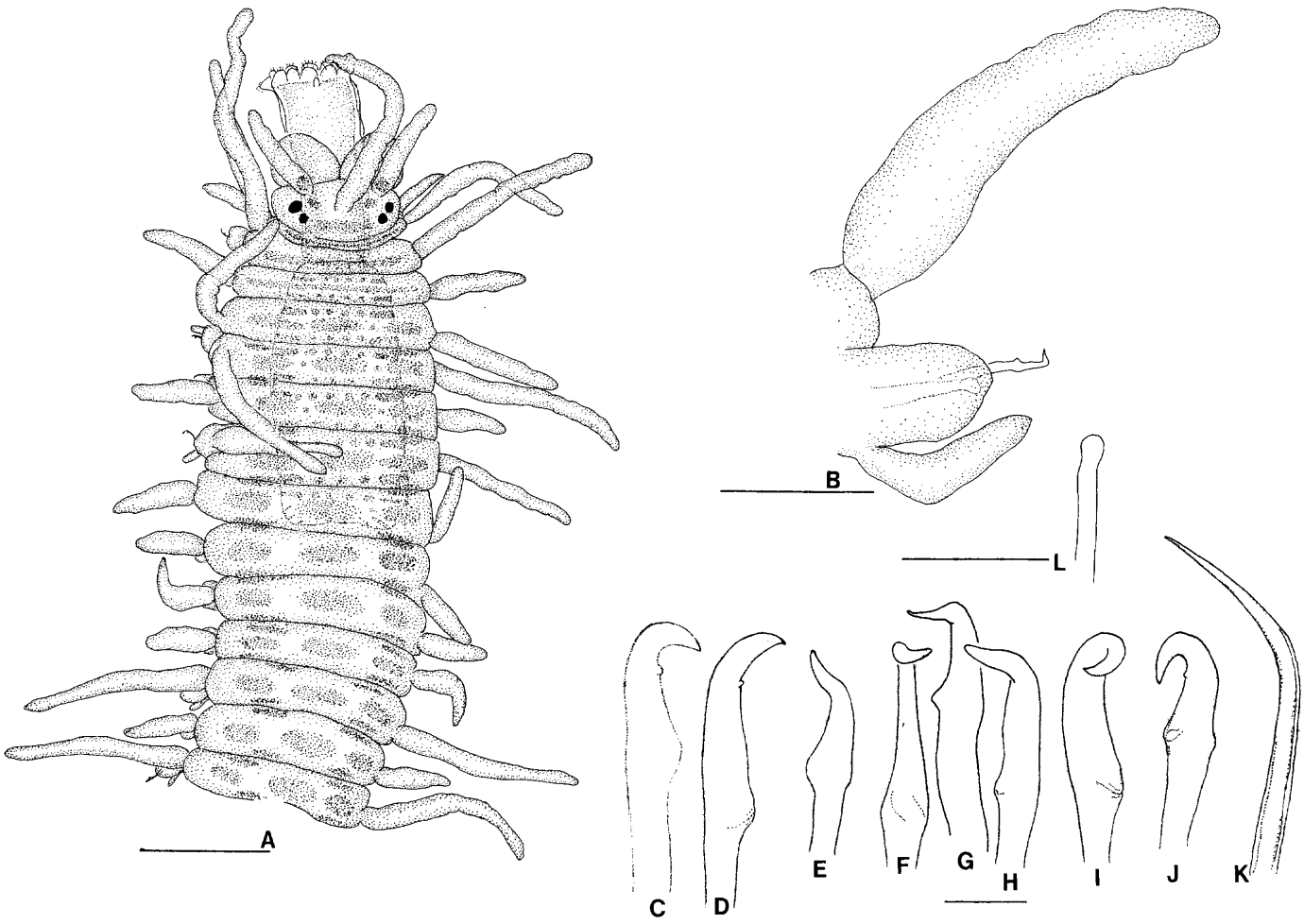

Fig. 3. *Alcyonosyllis glasbyi* n. sp. A, anterior part. B, parapodium of midbody. C-J, chaetae with various tip shape. K, anterior part of epitokal chaetae. L, acicula. Scales are 0.18 mm (A), 48 μm (B), 7 μm(C-K), 20 μm (L).

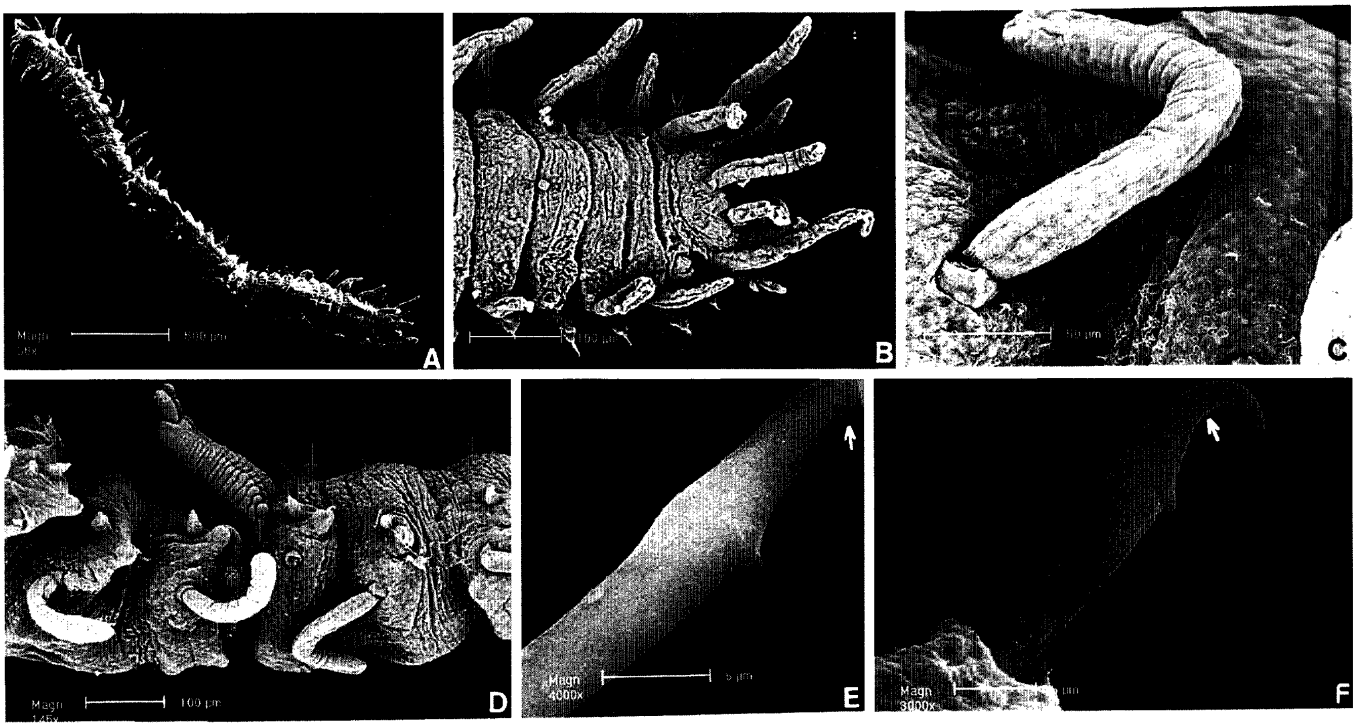

Fig. 4. *Alcyonosyllis glasbyi* n. sp., SEM micrographs. A, anterior part and midbody, dorsal view. B, anterior end, dorsal view. C, dorsum and dorsal cirrus of midbody, showing dorsal pores. D, posterior end and anterior part of stolon, showing the regenerated tail. E, middle part of chaeta, showing a boss and small teeth (arrow). F, chaeta with small teeth (arrow) and folded tip.

the tip appears to be flexible, since sometimes it is curved to bases of chaeta, forming a hook (Fig. 4F) or right angle (Fig. 3G, H), and fragile, because sometimes is broken or with aberrant shape, then tip modified into some shapes, as tip weakly curved (Fig. 3C, D), bent upward (Fig. 3E) and downward (Fig. 3 I, J), curled (Fig. 3F, I), forming a right angle (Fig. 3G, H); normal chaetae usually with curved tip as Figs. 3C, D, H, 4F. Aciculum solitary, indistinct, distally rounded (Fig. 3L). Pygidium small, with two anal cirri similar to long dorsal cirri. Pharynx through 4–5 segments when retracted; anterior rim provided with a crown of 10 soft papillae, each provided with numerous cilia; pharyngeal tooth small, located near dorsal anterior margin. Proventriculus through 5–6 segments, with about 25–30 muscle cell rows.

Reproductive biology: A single stolon per one stock still attached to the parent was observed among the paratypes and a few non-type specimens of *Alcyonosyllis glasbyi* n. sp. During the development of the stolon, a new regenerated tail is in process of formation (Fig. 4D); anterior chaetigers of regenerated tail have small chaeta and posterior ones without chaetae. Stolons with 2 pairs of anterolateral eyes and two pairs of lateral antennae (Fig. 2G, H); body light pink in color and generally enlarged relative to the stock, chaetae are withdrawn within parapodia, and emergent epitokal chaetae (slender and partly flat, ca. 15 to 20 in number, 400 to 500 μm in length; Fig. 3K) appear between parapodial lobe and dorsal cirrus (Fig. 2 G, H). Immature stolon with short spitokal chaetae and eyes indistinct, mature ones with extended chaetae and distinct eyes (Fig. 2G): the epitokal chaetae absent on body of stock. The stolonization pattern is the same described by Glasby and Watson (2001) for *A. phili*.

Etymology: The new species is named after Dr. Chris Glasby, Museum and Art Gallery of the Northern Territory, Darwin, Australia, who made important contributions to the knowledge of the polychaetes in general and syllids in particular, and also participating the past description of the genus *Alcyonosyllis*.

Remarks: *Alcyonosyllis glasbyi* n. sp. differs from all other species of the genus in having a solitary chaeta per parapodium, occasionally two, but this appears to be a process of replacement, and the shape of the chaeta. *Alcyonosyllis phili* has 2–3 chaetae per parapodium, thicker than those of the new species, with smaller boss, as well as much more aciculae per parapodium. It is also a larger species, with different colour pattern and more strongly marked differences in the size of the dorsal cirri (see Glasby and Watson, 2001). The senior author (G. S.-M.) has examined one paratype of that species and he had verified these differences. *Alcyonosyllis xeniaecola* has 2–4 chaetae per parapodium, and the chaetae are different although similar (see Hartmann-Schröder, 1993). *Haplosyllis bisetosa* likely belongs to this genus; it differs from the new species in having two chaetae per parapodium, with stronger boss and, in some chaetae there are big secondary teeth (see Hartmann-Schröder, 1960). *Syllis onkylochaeta* Hartmann-Schröder, 1991, a species collected in an aquarium of Düseldorf (Germany), living on corals of the genus *Xenia*, and probably original from Bali (Indonesia), is probably closely related with *Alcyonosyllis*, but it has articulated dorsal cirri and compound chatae, together simple chaetae similar to the described for the species of *Alcyonosyllis* (see Hartmann-Schröder, 1991).

Among the Japanese Syllidae, the species of the genus *Haplosyllis*, *Geminosyllis* and *Trypanosyllis (Trypanobia)* have simple chaetae only. However, all these taxa have articulated dorsal cirri. Moreover, *Geminosyllis* and *Trypanosyllis (Trypanobia)* have a pharyngeal trepan and the latter has flattened body (see Imajima, 1966).

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